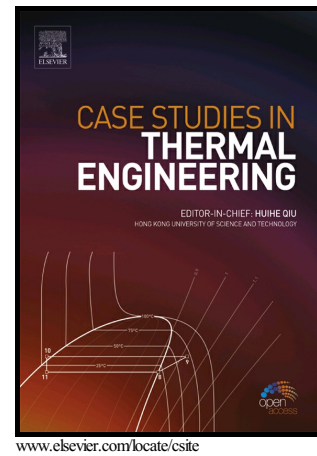


Author's Accepted Manuscript

Thermal Analysis in Stokes' Second Problem of Nanofluid: Applications in Thermal Engineering

Ilyas Khan, Kashif Ali Abro



PII: S2214-157X(17)30337-4
DOI: <https://doi.org/10.1016/j.csité.2018.04.005>
Reference: CSITE276

To appear in: *Case Studies in Thermal Engineering*

Received date: 20 December 2017

Revised date: 30 March 2018

Accepted date: 6 April 2018

Cite this article as: Ilyas Khan and Kashif Ali Abro, Thermal Analysis in Stokes' Second Problem of Nanofluid: Applications in Thermal Engineering, *Case Studies in Thermal Engineering*, <https://doi.org/10.1016/j.csité.2018.04.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Thermal Analysis in Stokes' Second Problem of Nanofluid: Applications in Thermal Engineering

Ilyas Khan^{1*}, Kashif Ali Abro²

¹Faculty of Mathematics and Statistics, Ton Duc Thang University, Ho Chi Minh City, Vietnam.

²Department of Basic Sciences and Related Studies, Mehran University of Engineering Technology, Jamshoro, Pakistan

*Corresponding author: Dr. Ilyas Khan, Faculty of Mathematics and Statistics, Ton Duc Thang University, Ho Chi Minh City, Vietnam. ilyaskhan@tdt.edu.vn

Abstract

Present study is prepared to analyze the heat transfer for the Stokes' second problem of nanofluid. Water is taken as base fluid and two types of nanoparticles namely copper (*Cu*) and silver (*Ag*) are suspended in it. Exact solutions for velocity field and temperature distribution have been investigated by utilizing the Laplace transform method and presented in the form simple elementary functions. The results lead to the few facts regarding the effects of rheological and pertinent parameters on the graphical illustrations. Heat transfer is decreased with increasing nanoparticles volume fraction. Hartman number and porosity have opposite effects on fluid motion. This study has several applications in thermal engineering.

Key word: Copper (*Cu*) and silver (*Ag*); Water; Stokes second problem; Heat transfer

Nomenclatures:

F	Velocity field
Ω	Non-zero constant
ω	Frequency of the oscillation
μ_{nf}	Dynamic viscosity
ϕ_1	Porosity
ρ_f	Viscosity of the fluid fraction
ξ	Spatial variable
M	Magnetic parameter
τ	Time
Ha	Hartman number
k	Permeability of porous medium

Download English Version:

<https://daneshyari.com/en/article/7153298>

Download Persian Version:

<https://daneshyari.com/article/7153298>

[Daneshyari.com](https://daneshyari.com)